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APPLICATION FOR LETTERS PATENT
OF THE UNITED STATES

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TITLE OF INVENTION: PRIVATE COMMUNICATIONS NETWORK
INCLUDING CONNECTED PUBLIC
COMMUNICATIONS DEVICES AND
METHOD OF OPERATION THEREOF

TO WHOM IT MAY CONCERN, THE FOLLOWING IS
A SPECIFICATION OF THE AFORESAID INVENTION

PRIVATE COMMUNICATIONS NETWORK INCLUDING CONNECTED PUBLIC COMMUNICATIONS DEVICES AND METHOD OF OPERATION THEREOF

5 BACKGROUND OF THE INVENTION

Field of the Invention

The present invention is related to a telephonic communications network and
10 more particularly to a telephonic communications private network such as a Private
Branch Exchange (PBX) Internet Protocol (IP) based network.

Background

15 State of the art communications servers such as a Private Branch Exchange
(PBX) Internet Protocol (IP) based system have facilitated the convergence of voice
and data communications, allowing businesses to bring voice and data systems
together to form a seamless, efficient communications network. Typical
communications servers, such as for example the Hicom 150H from Siemens
20 Information and Communications Networks, Inc. (Siemens ICN), when
supplemented with digital telephones, such as the Siemens family of Optiset®
Digital Telephones, results in a full featured local telephone network.

In particular, users connected to such a full featured local telephone network
25 can share both data and voice based information in applications across the existing
network to improve productivity. State of the art local telephone networks are Local
Area Network/Wide Area Network (LAN/WAN) based IP networks that are
expanded easily, simply by adding extra IP telephones. Further, a user at a personal
computer (PC) on the LAN/WAN can connect to the communications server and
30 seamlessly communicate with other connected users. Thus, a private
communications network that includes one of these state of the art communications
servers provides user mobility and easy access for teleworking, as well as low cost
voice over IP (VoIP) communications.

35 Normally, however, in order for the local telephone network users to have
access to all of the communications server features, the users must have a high speed
connection to the communications server, e.g., be connected to the LAN/WAN over

a high speed broadband connection, such as a Digital Subscriber Line (DSL) or a cable modem line. These users with such a high speed connection can run a proprietary client application on a remote PC to communicate using VoIP.

5 Unfortunately, broadband is far from being universally available. Typically, the only available access to the communications server is by modem over a public switching telephone network (PSTN) or over a wireless device, e.g., a cell phone. Currently, neither hardware nor software is available in the prior art that makes all features of the communications server available to every user, including those users
10 without a broadband connection. So, normally remote users cannot access all the features of the communications server.

 Thus, there is a need to provide full access to all communications server features to remotely located users with a typical analog, land line or wireless
15 connection.

SUMMARY OF THE INVENTION

 It is a purpose of the invention to make PBX features available to remotely
20 located users.

 The present invention is a virtual private communications network (VPCN) and method of using the VPCN. The VPCN includes a communications server and at least one communications trunk connecting the communications server to a public
25 telephone network. A web server and one or more digital telephones may be connected to the communications server. A remotely connected device (such as a PC or WAP) communicating with the communications server acts as a locally connected digital telephone. A remote telephone located in the vicinity of the remotely connected device provides telephonic communications in cooperation with
30 the communications server controlled by the remotely connected device.

BRIEF DESCRIPTION OF THE DRAWINGS

 Figure 1 shows a preferred embodiment communications network or system
35 such as a Public Branch Exchange (PBX) Internet Protocol (IP) based communications network or system;

Figures 2A-B show an example of a TAPI graphical user interface (GUI) and a call management screen;

Figure 3A shows an example of a drop down window for accessing communications server features; and

Figure 3B shows an example of a local address book with entries identified by images for visual contact information.

DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE PRESENT INVENTION

Figure 1 shows a preferred embodiment communications network or system 100 such as a Public Branch Exchange (PBX) Internet Protocol (IP) based communications network or system. Communications server 102 is connected to a web server 104 over a local area network (LAN) 106. Further, the communications server 102 is connected through the LAN 106 to the Internet 108 and one or more digital phones 110. One or more trunks connect the communications server 102 to a public switching telephone network (PSTN) 112, 114. A remote user (e.g., at home or in a hotel room) at a remote web enabled device such as personal computer (PC) 116, may connect to the communications server 102 over the Internet 108. Any remote users with at least a low speed (low data rate) connection to the Internet 108 may use Telephony Application Program Interface (TAPI) on a personal computer 116 in combination with any telephonic device in the same vicinity to have access to all communications server features. Suitable low speed connection devices include, for example, an analog or land line telephone 118 connected to a PSTN 112, a personal digital assistant (PDA) (not shown) or the like with a wireless internet connection, or a wireless access protocol (WAP) device, such as a cell phone 120 connected to a WAP/cellular network connected to PSTN 114. These low speed connection devices may also be suitable telephonic device connections.

According to a preferred embodiment of the present invention, remote users connect over the Internet using the TAPI to interface with the communications server. Figure 2A shows an example of a graphical user interface (GUI) for the Hicom 150H communications server from Siemens ICN which may be used to control normal voice communications over voice communications devices (118, 120 in Figure 1). A typical stand alone computer client interface, such as for example,

OPTICLIENT version 2.0 from Siemens ICN, provides access to most communications server features. Figure 2B is an example of a call management screen. In this example, the OPTICLIENT emulates the OPTISET digital phone, also from Siemens ICN, on the user's PC. Once connected and logged in, the client application is treated as any other locally connected (i.e., connected directly to the LAN) digital phone. Simultaneously, the remote user communicates telephonically with another device connected to the PSTN, e.g., a land line phone 116 or cell phone 120. The resulting hybrid connection that includes the TAPI internet connection in combination with a low data rate device, appears to the rest of the system as just another locally connected digital telephone. Thus, all PBX system features are available to the user using this hybrid connection.

The hybrid connection of the TAPI interacting with the communications server 102 of Figure 1 in combination with a low speed voice connection, e.g., the land line telephone 118 or the cell phone 120, effectively, is a virtual digital telephone and the network 100 is a virtual private communications network. Using this virtual digital telephone, the connected remote user may direct communications through communications server 102 nearly identically to on-site and locally connected users. Thus, in a typical telecommuting application, a remote user may initiate an in-system conference call from the remote location. So, in this example, the telecommuter may place a call to an in-system digital phone through the communications server. Then, the party at that digital phone is connected to the user's cell phone 120 or land line telephone 118 for an apparently in-network call.

Advantageously, regardless of location or connection type (modem, DSL, etc.), any remote user (telecommuter) with any IP connection and, simultaneously, some form of telephonic communications also available, has full access to the numerous robust capabilities and features of the communications server such as the drop down window examples of Figure 3A. These features may include, for example, call connection processing to allow the user to make/accept calls or to terminate calls. Call status partner identification and call duration may be displayed at the TAPI. A visual indication of other incoming calls may be provided at the TAPI in a minimized window. A call hold/resume feature may allow the user to provide music-on-hold for incoming calls. Also, a consultation feature may be included to allow the user to toggle between alternate calls, e.g., call waiting, or to ping pong between several simultaneous calls. A (last) number redial may be included that lists several previously dialed numbers for redialing. Call forwarding

may be provided to automatically forward calls without consultation or, if so desired, after consultation. Also, this call forwarding feature may be type selectable such that call forwarding type is fixed or, depends upon whether the called party answers after a selected number of rings or if the line is busy. Further, the TAPI

5 may display call forwarding information for the user. Local speed dialing keys may be included and provided by the TAPI, to preprogram connections between the low data rate phones and other phones, including both local digital telephones and other non-system phones. As can be seen from the example of Figure 3B, the TAPI may include a local address book with entries identified by images, providing visual

10 contact information. These images and the address book may be stored locally, on the user's local PC, on the web server or, on another server.

In addition to the PBX type features, the TAPI provides the remote user with other system and user management functions that are normally available on such a

15 system. These other features may include application sharing, work collaboration, project collaboration, typical e-mail functions as well as e-mail with integrated voice features. Typical e-mail functions are those such as may be provided by Microsoft Outlook or the Outlook™ Integration features provided in the Siemens

20 OPTICLIENT 360.

Thus, referring again to Figure 1 in a preferred embodiment hybrid connection, telephonic communications proceeds over a cell phone 120 or a land line telephone 118 through the communications server 102 between remote and local users, seamlessly. Intra system calls are placed from the hybrid connection

25 just as if the remote users were connected directly to the system 100. Advantageously, voice communications are routed over any available conventional path and using conventional hardware and software and, since the minimal control data is passed over the Internet, there is no minimum performance or Quality of Service (QoS) requirement to maintain the communications link. An ordinary

30 modem suffices, even a low performance modem, e.g., 33.6, 28.8 or even 14.4.

In another example, a first remotely connected party, e.g., a telecommuter can initiate a conference call to connect two internal or external parties (one connection being to the telecommuter's land line), while the remote initiating system

35 (PC) remains outside of the conference call. The first party has full access to all communications server features over the hybrid connection. The web server handles internet protocol communications with remote users. Calls initiated by or, directed

to the remote user are handled by the web server, which interfaces the remote user to the communications server.

5 So, as described above, the client may initiate a conference call between any two phones in the world that are accessible from a PSTN. For a three party conference call, the client PC can place a call to the user's cell phone, e.g., at 706-7766 in one area code. Then, the client PC can place the cell phone call on hold. Once the connection is made and, with the first call on hold, the client PC can place a second call to a land line phone, e.g., to 955-8003 in another distant area code. 10 Thereafter, the client PC can go to consultation mode. In this example, both cellular and fixed, land line phones are connected over the communications server, while the client PC retains full control over the IP connection and has access to all server features. So, as the call progresses, the user may selectively forward conference call participants to another number, decide whether subsequent callers may join the conference call, are forwarded to another number, are connected to voice mail, etc. 15

In another preferred embodiment, instead of the web server, a WAP server provides internet access to WAP enabled devices such as web enabled cell phones, wireless enabled PDAs and the like. So, any Internet capable WAP device has the full feature range of the communications server available. The user controls calls using the Internet capable or web enabled cell phone functions, interfacing the cell phone's wireless Internet browser with the communications server. Again, the communications server, treats the hybrid connection of the combination of the web-based interface connection and telephone connection as any other digital telephone, 20 making all communications server features accessible to the user from remote cell phone browser. Available communications server features are presented to the user over the browser interface, simultaneously with the call. 25

Accordingly, the present invention allows multiple parties to participate in conference calls through a communications server, whether the parties are local to the communications server or located at remote locations and connected through a low speed connection, e.g., a land line telephone or a cell phone. Such a hybrid conference call is made in cooperation with a web server or WAP server to provide remote users with full access to the communications server features, using standard 30 land line phone or cell phone in cooperation with parallel access to the communications server for a virtual digital phone connection. 35

While the invention has been described in terms of preferred embodiments, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the appended claims.

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